Dial One for Scam:
A Large-Scale Analysis of
Technical Support Scams

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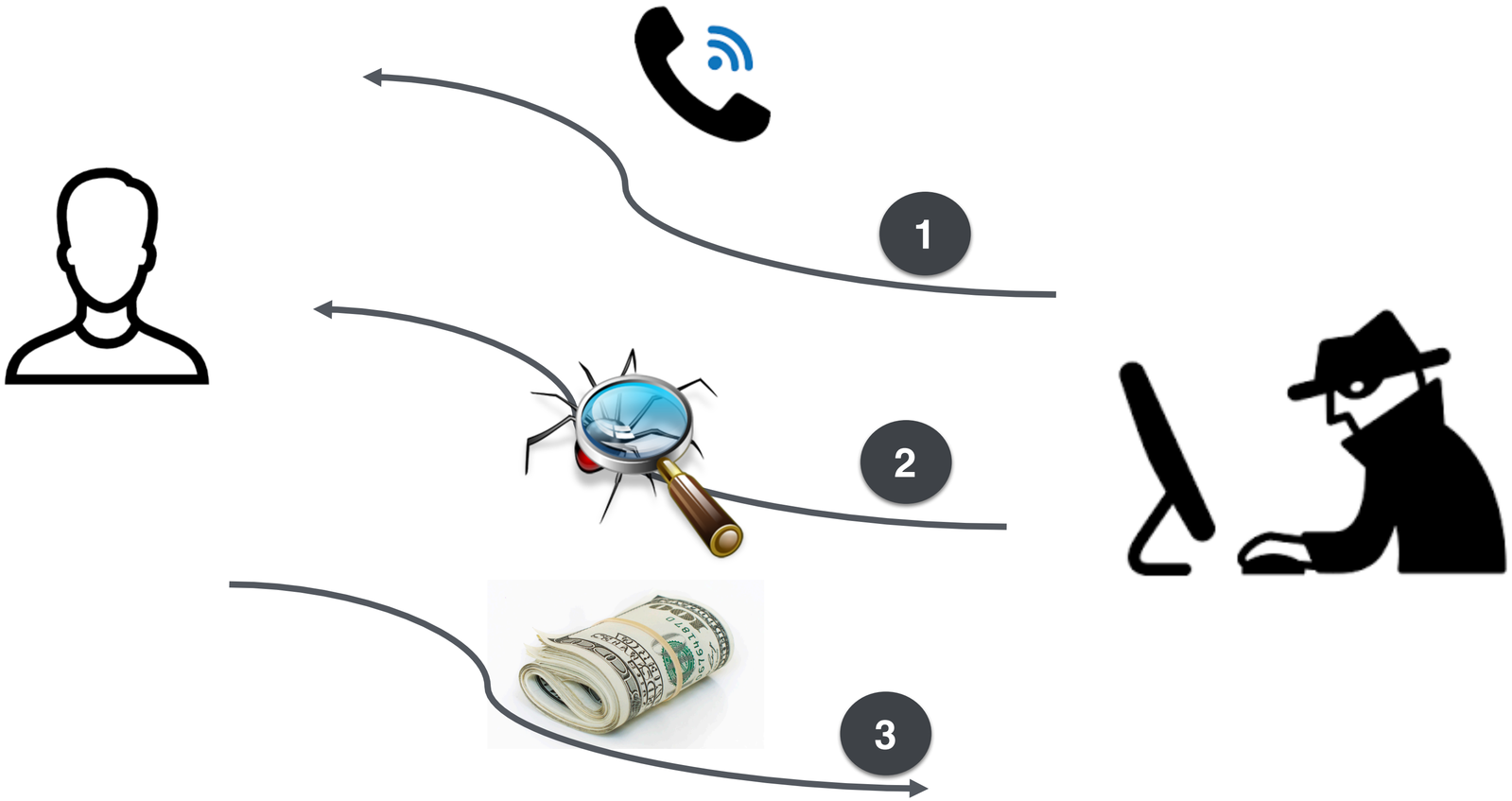
What are Tech Support Scams?

Tech Support Scam Evolution

2008	Fake support cold calls
2013	A Twist: Scammers started to use malvertising
2014	IC3 issued a public service announcement
2014	Microsoft sued several campaigns
2015	FTC took down several big campaigns
2016	IC3 issued a public service announcement
2017	Got more aggressive and still an increasing threat

Tech Support Scam (Cold Calls)



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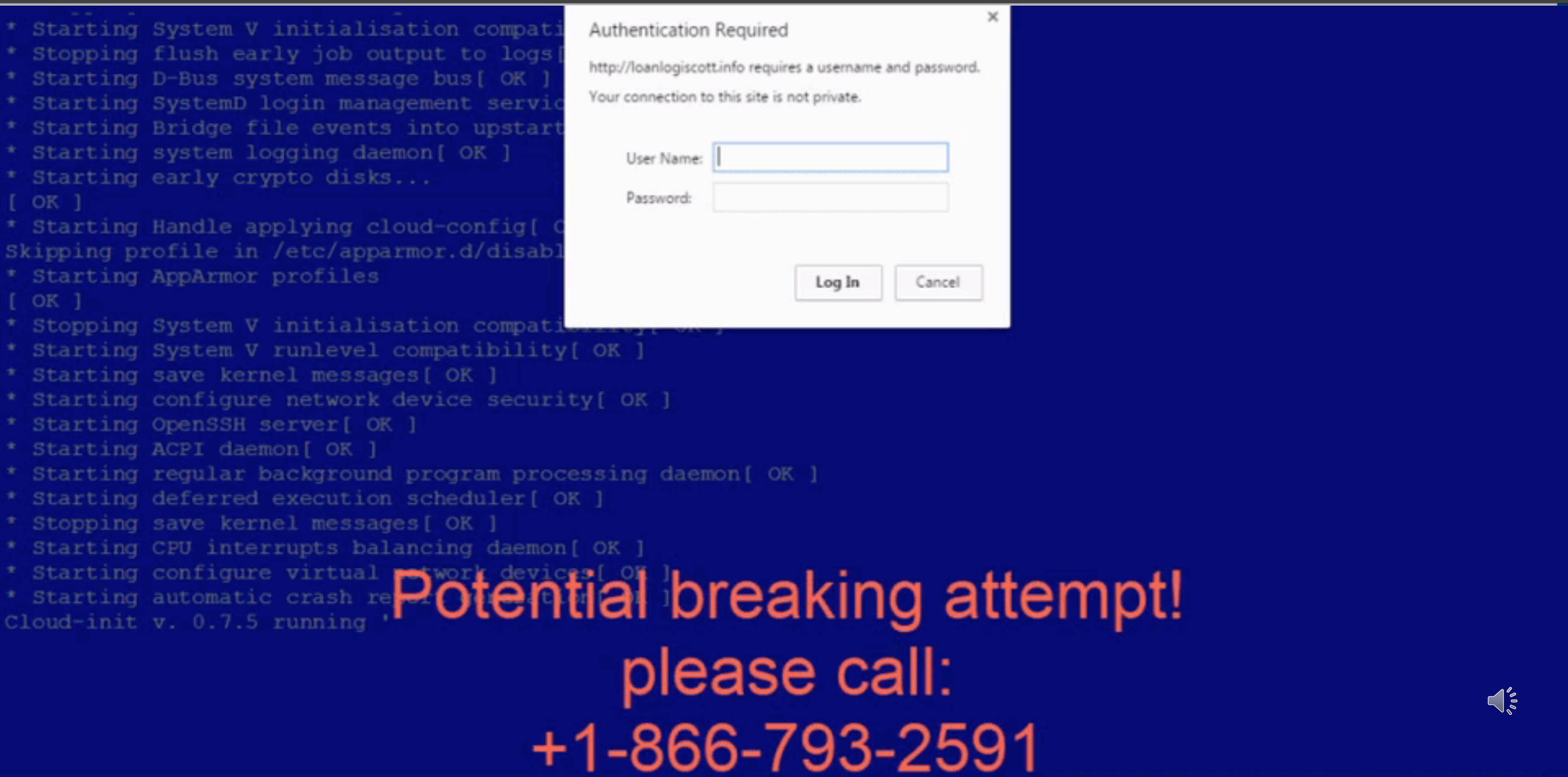
Tech Support Scam (malvertising)

Tech Support Scam Page(1)



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Growth of 200%

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A neverending story: PC users lose another $120M to tech support scams

Court stops alleged scamming operations, but an end to the problem is elusive.

by **Jon Brodkin** - Nov 19, 2014 2:33pm EST

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By Michael Cooney | Online News Editor | Follow

About | Layer 8 is written by Michael Cooney, an editor with Network World.

OPINION

FTC takes out “tech support” scammers; $5.1 million in fines, retribution

Fraudsters masqueraded as Dell, Microsoft, McAfee, Norton and others

Growth of 200%

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A never ending story [illegible] on tech support

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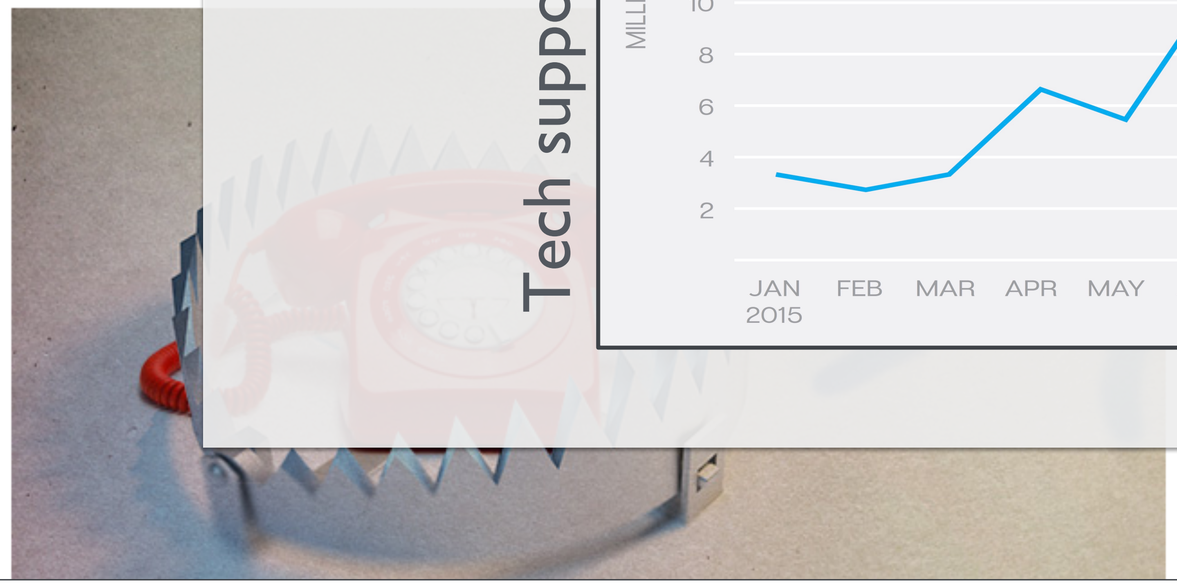

Symantec Report (2016)

Tech support scams

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About

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OPINION

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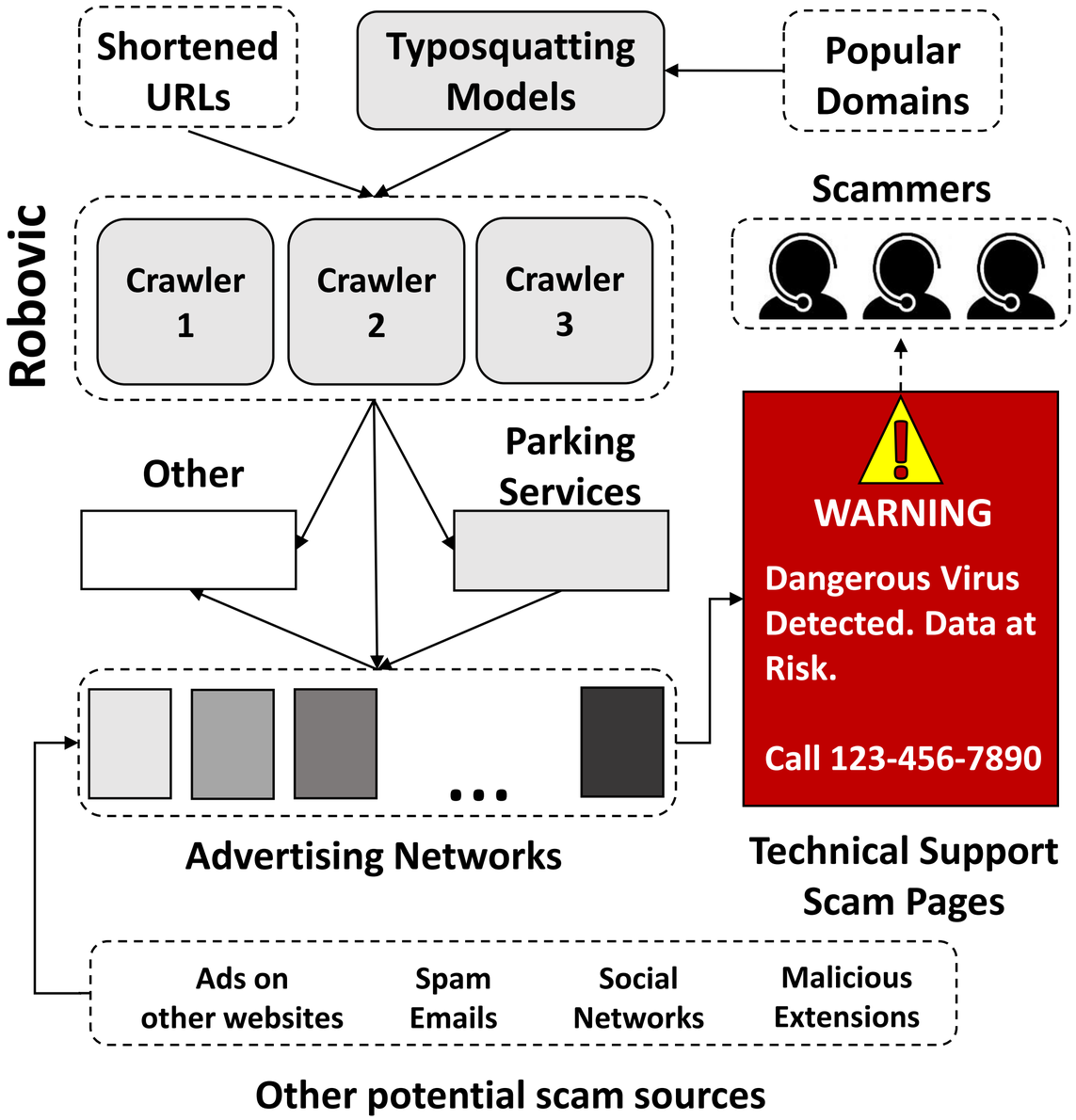
Research Goals

- Systematic study of Tech Support Scam ecosystem
- To investigate the:
  - Prevalence
    - # Domains, # Phone Numbers, and #Scam Campaigns
  - Details about the underlying infrastructure
    - Hosting providers, ASes, and Telecommunication companies
  - Evasion and social engineering techniques
    - Tools used, call-center infrastructures, and prices

Tool Design (Robovic)

Data Collection Methodology



Collected Scam Domains

- Over 8 months
  - Crawled 8 Million domains
  - Resolved 5 Million domains
  - Detected 22,000 scam URLs
  - Extracted 8,600 unique scam domains
  - 1500 phone numbers

Short and readable domains

- computer-warning-message[.]com
- donotclose[.]website
- input-error[.]net

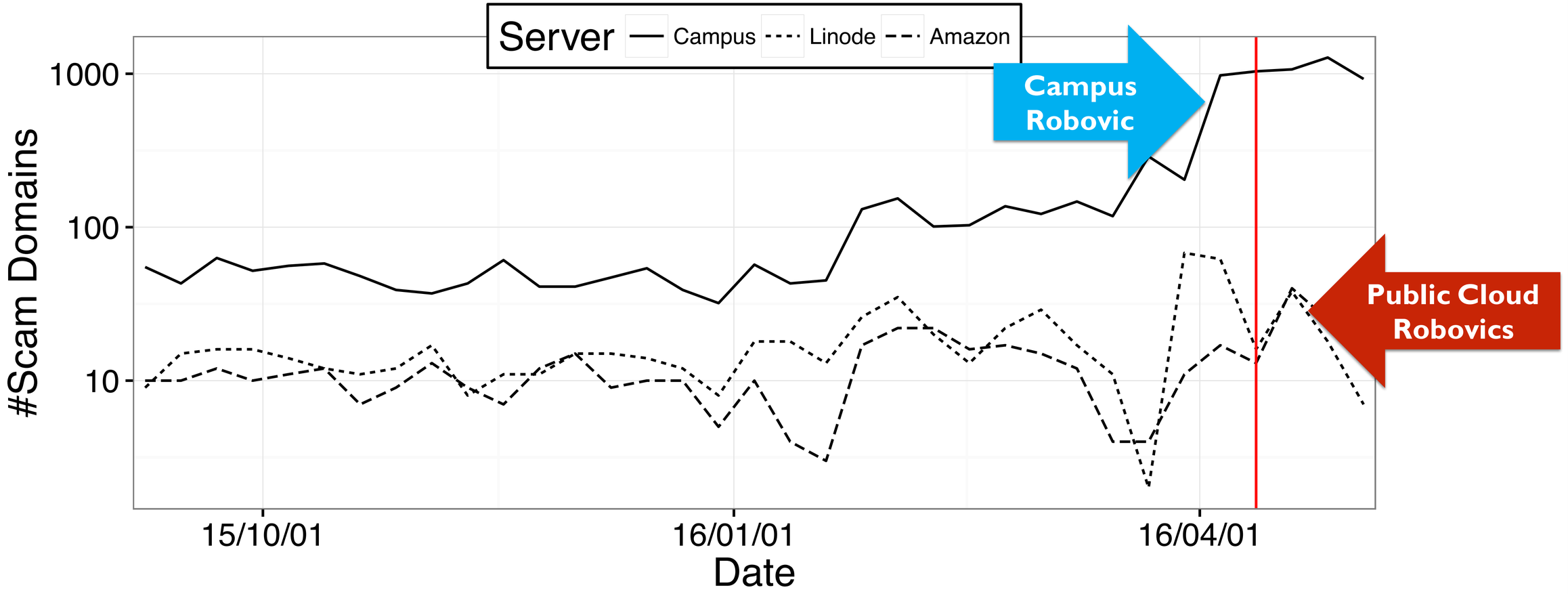
Long with readable parts

- 10.computerhaveaseriousproblempleasecallon18776431254tollfree.yourcomputerhaveaseriousproblempleasecallon18776431254tollfree.yourcomputerhaveaseriousproblempleasecallon18776431254tollfree.browsersecurity16[.]club

URLs from CDNs

- 1073964613.rsc.cdn77[.]org
- 924983738.r.cdnsun[.]net

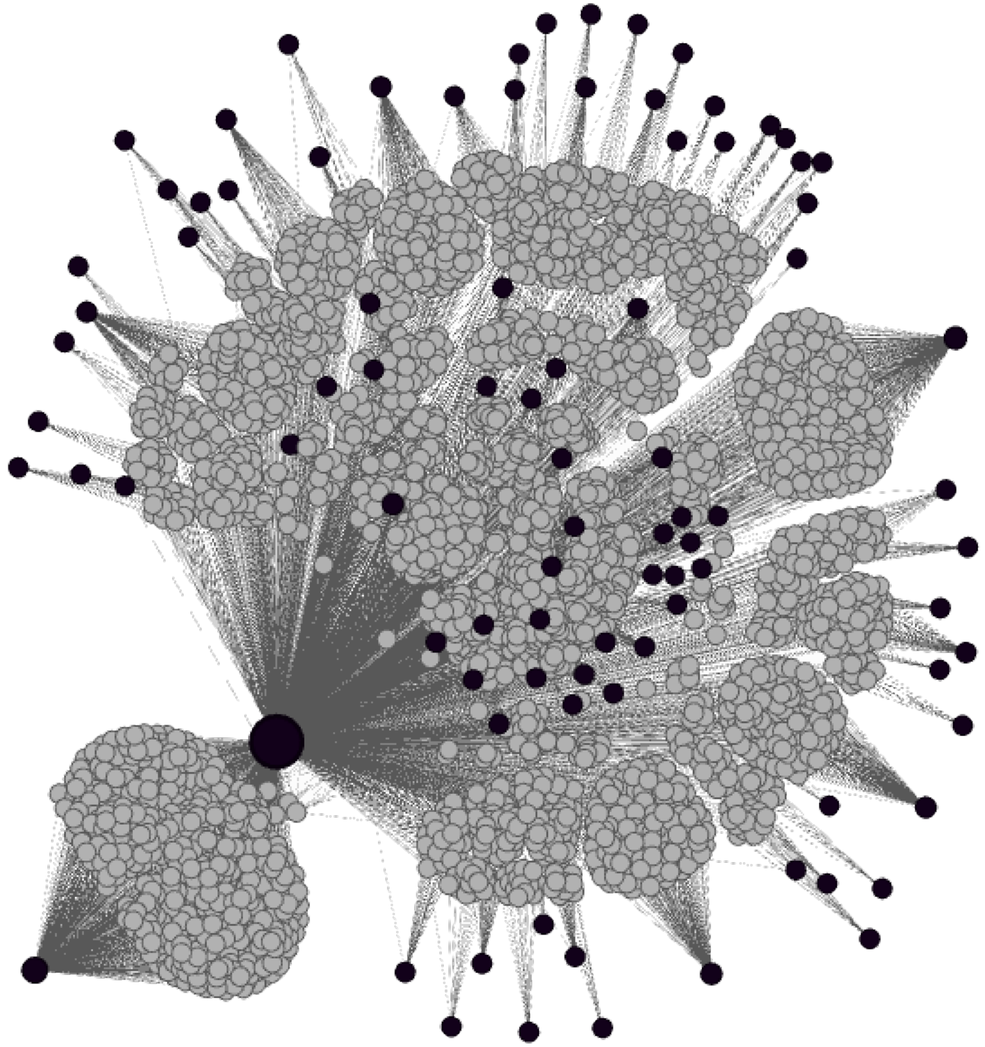
Weekly Scam Domains



Scam Domains & phone Numbers

- Hiding backend servers (16% used Cloudflare)
- Anonymized registration information (55%)
- Abuse a small number of Telco companies
  - 80% of numbers belong to Twilio, RingRevenue (Invoca), WilTel
  - Prefer those that provide APIs
    - Scalable solution for the scammers' business
- Number of phone numbers is much less than the number of domains
  - Phone numbers can link together domains of the same campaign

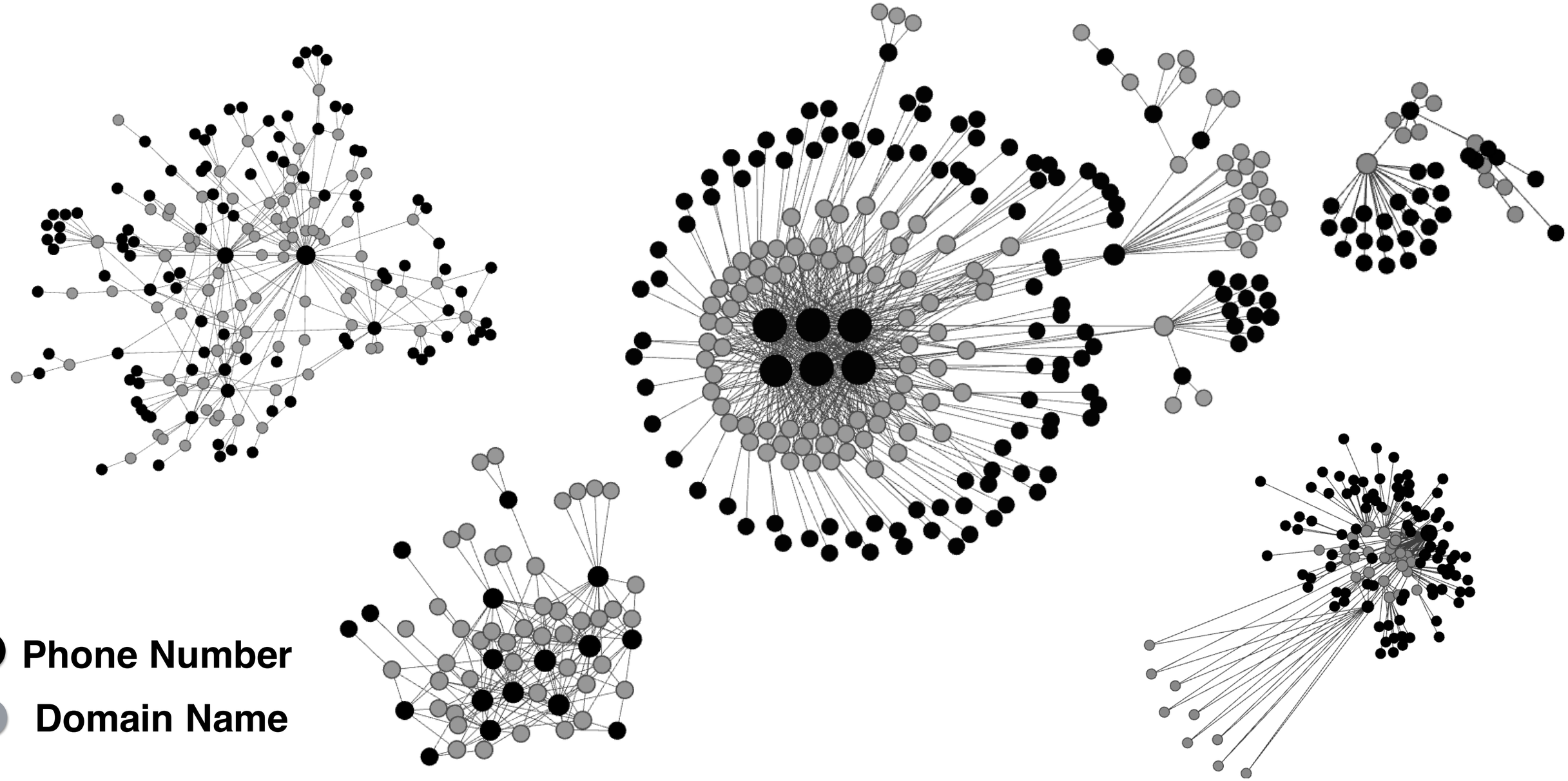
Scam Campaigns



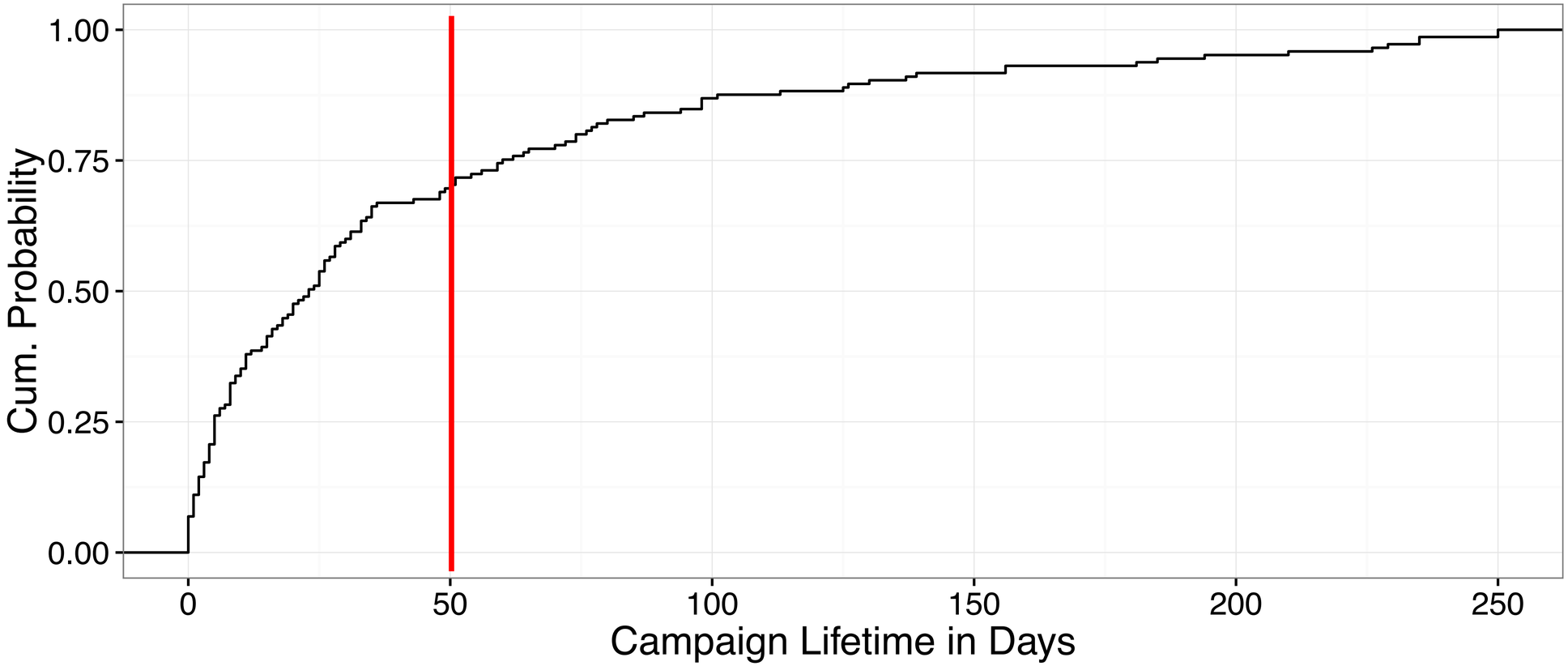
Phone Number

Domain Name

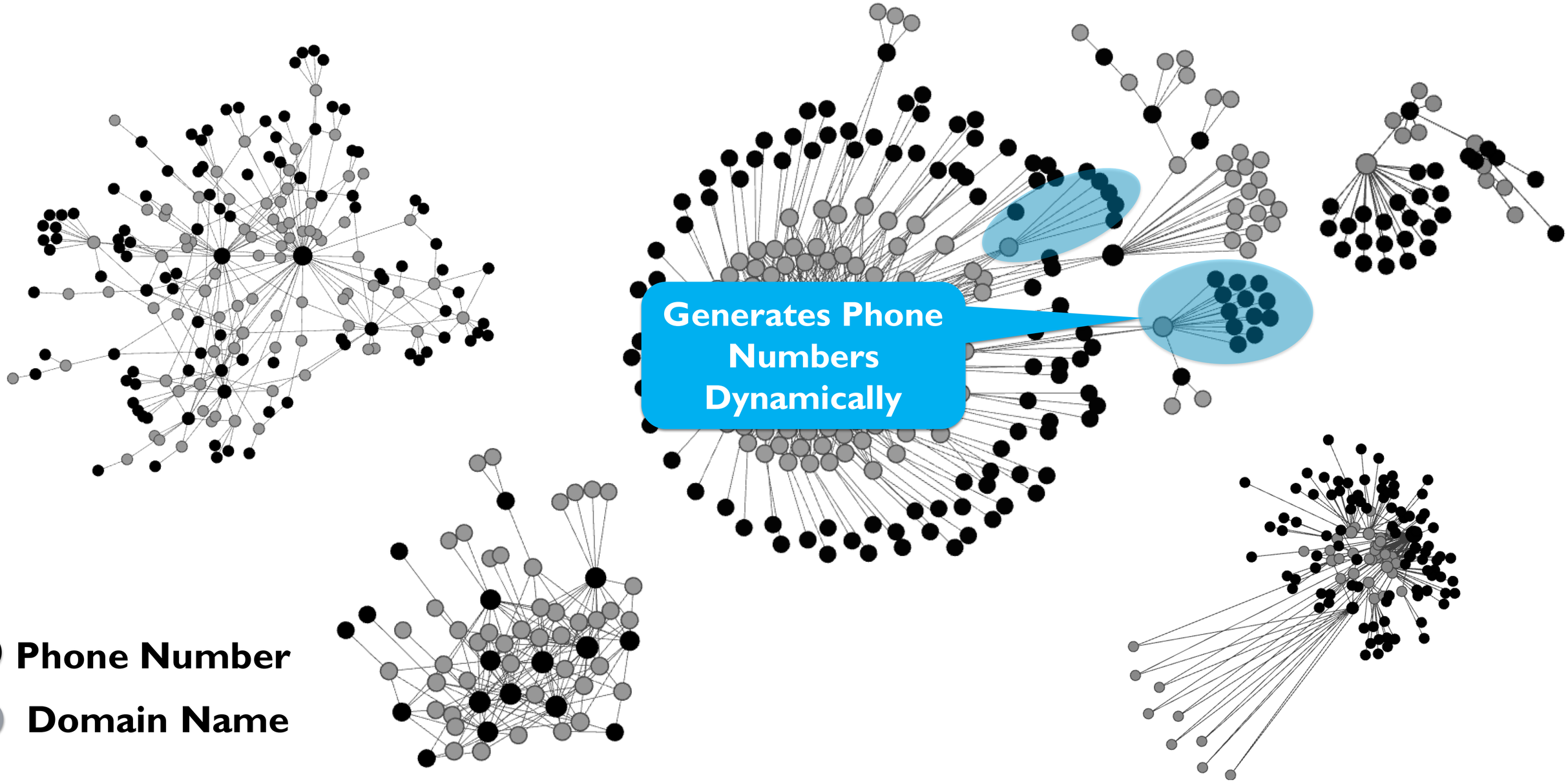
Scam Campaigns



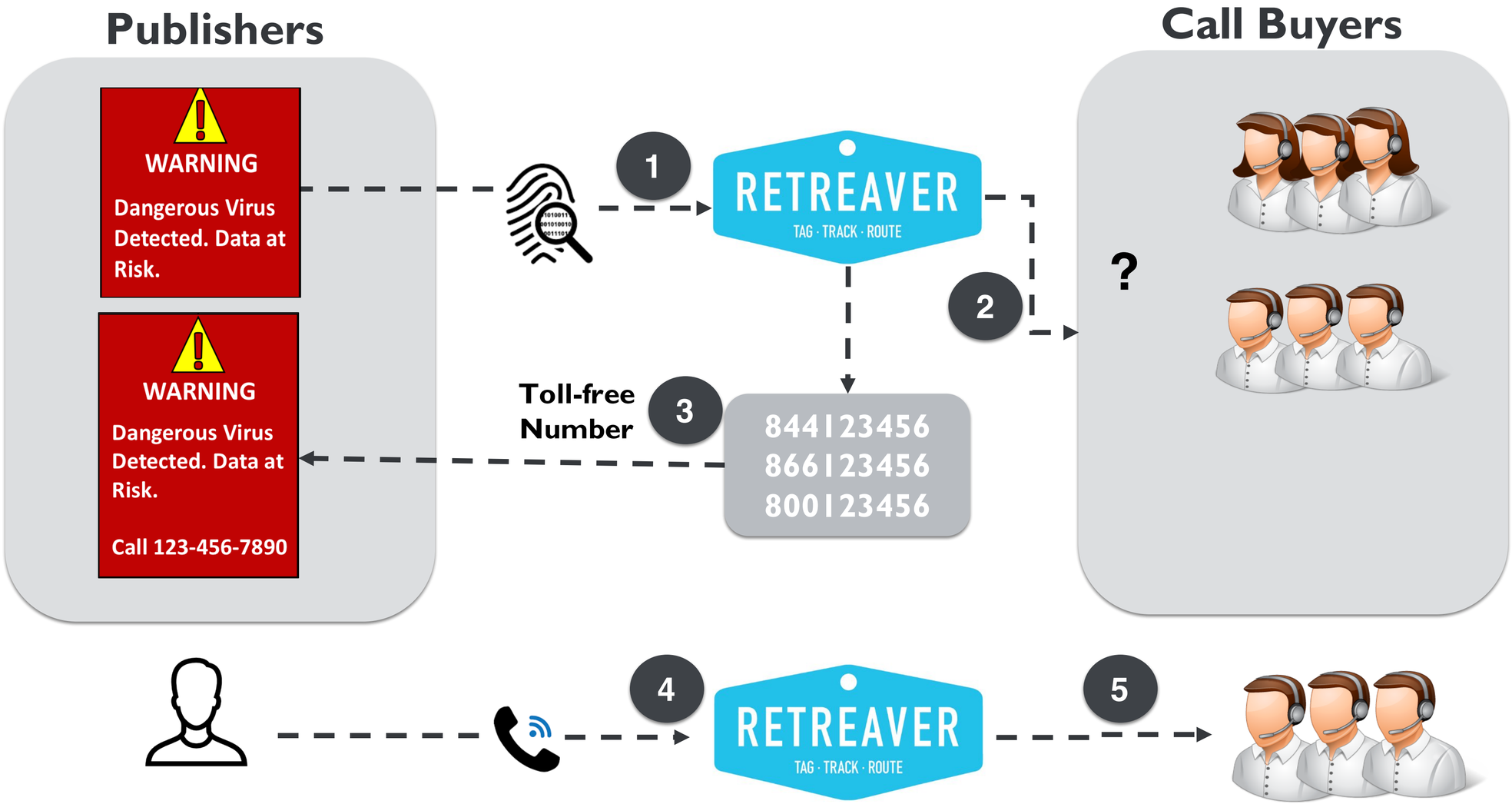
Life time of Campaigns



Phone-TLD+1 Relationship



Pay Per Call Marketing

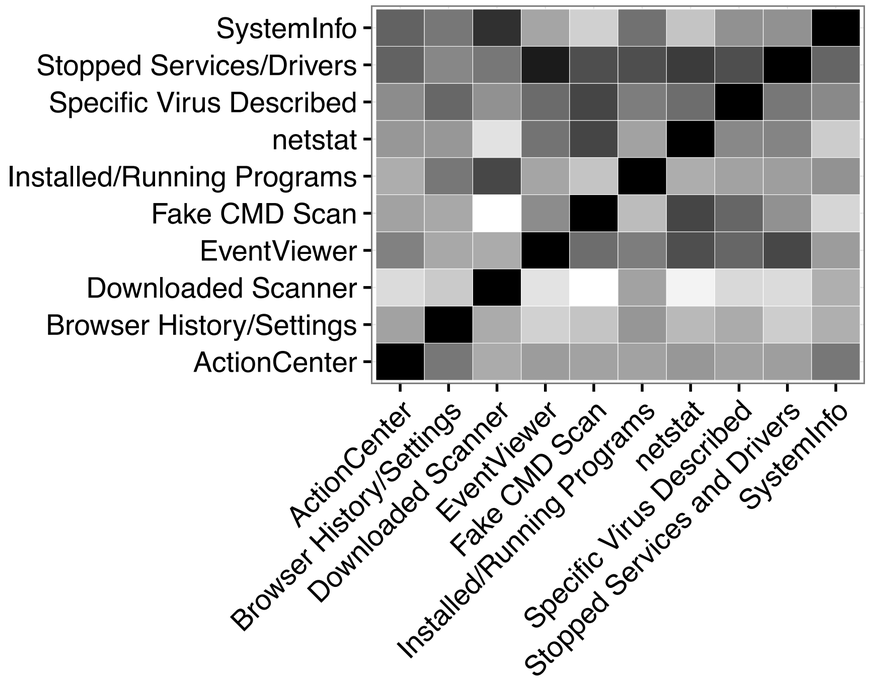


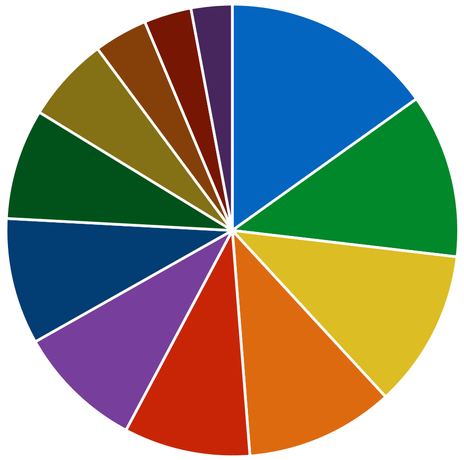
Meeting the Scammers

Environment set up

- Obtained permission from our IRB
- 60 interactions with the scammers
- Environment:
  - Artificially aged Windows 7 virtual machine
  - Tunneling the traffic through VPN
  - VoIP software with believable CallerID
  - Capturing network traffic, recording the screen and conversations

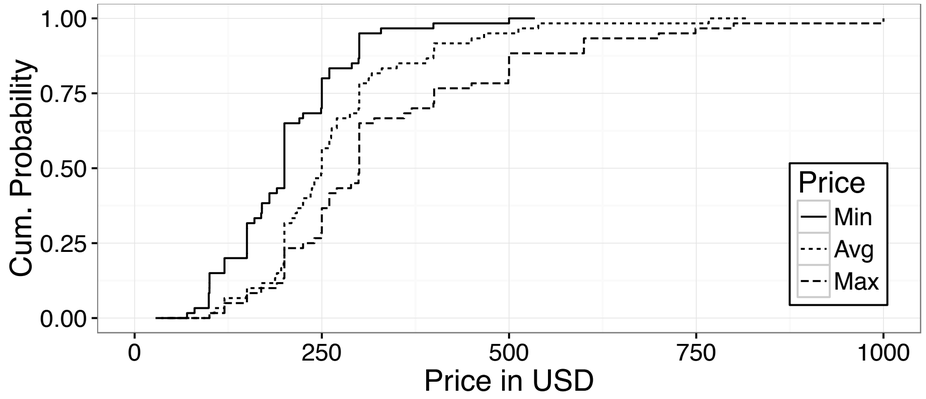
Scammers' Tools & Techniques





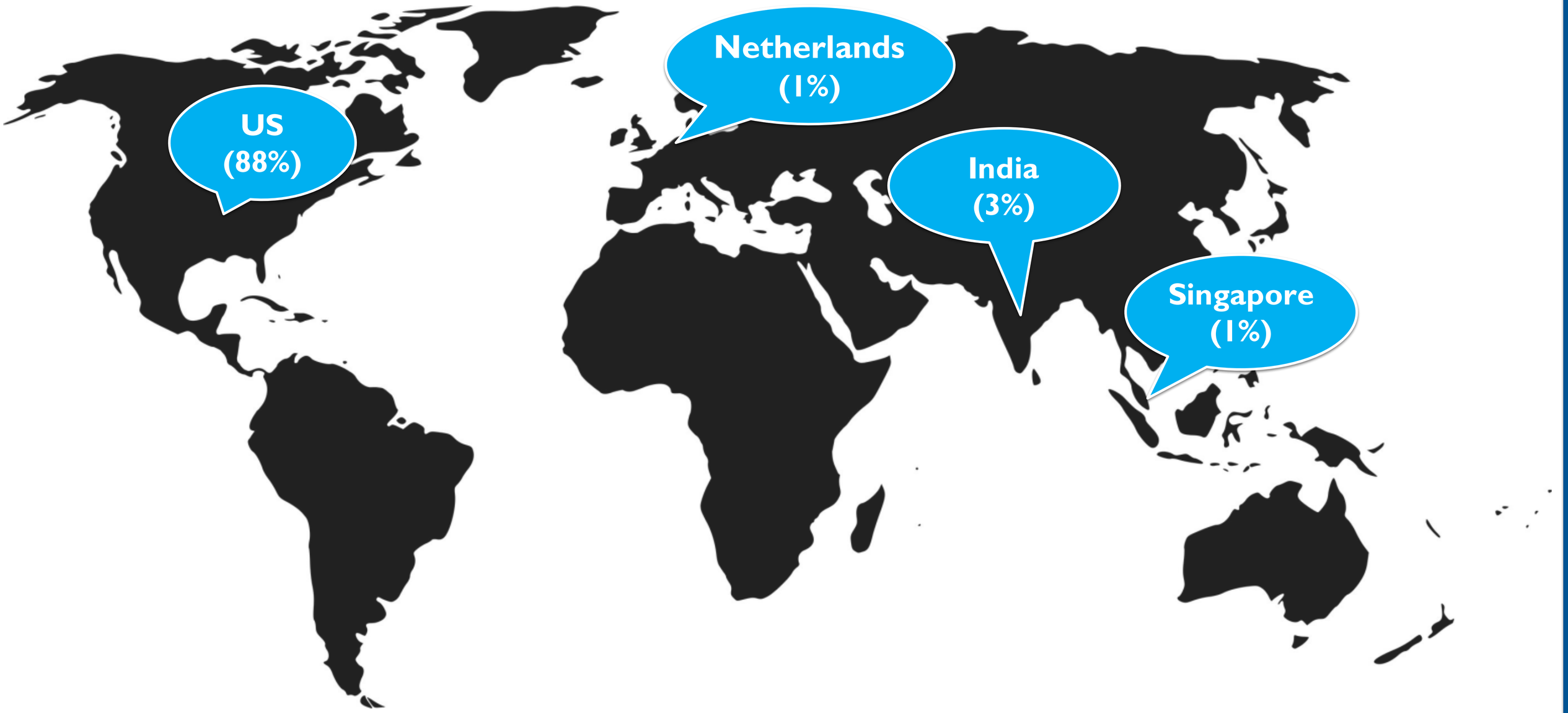
Social Engineering Techniques

- Stopped Services/Drivers
- Event Viewer
- Specific Virus Explained
- System Information
- Action Center
- Fake CMD Scan
- Netstat Scan
- Installed/Running Programs
- Browsing History/Settings
- Downloaded Scanner
- Reliability/Performance
- Other (Temp, Registry)

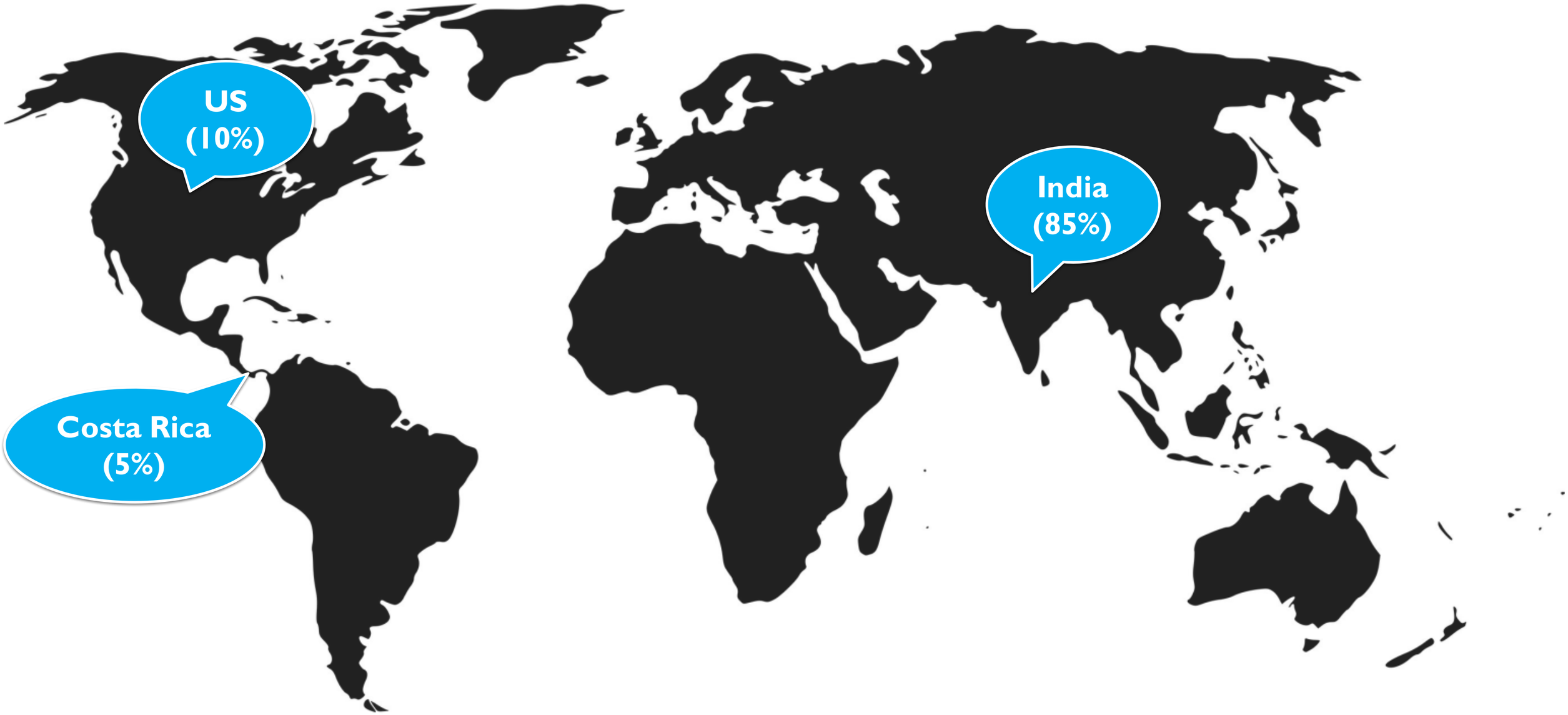


Scammer Physical Locations
&
Profit

Location of Scammers' Servers



Location of Call Centers



Number of Victims

- Monitoring Traffic of Scam Servers:
  - Misconfiguration of scam servers revealed their traffic
    - 142 scam domains were found which had misconfiguration
    - We monitored misconfigured servers every one minute over two months
  - Total visits : 1.7 million unique IPs
  - Max #visitors/domain : 138K unique IPs

Location of Victims

Scammers' Profit

Average price of Tech Support Scam Package ($290)

*

Number of Victims (1.7 million unique IPs)

*

Conversion Rate (2% as a similar scareware)

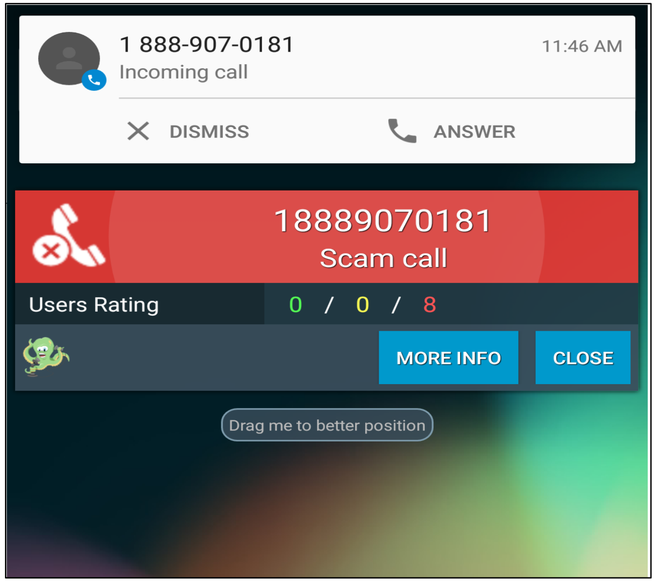
Scammers' profit = ~ $9.7 million in 2 months

(a lower bound)

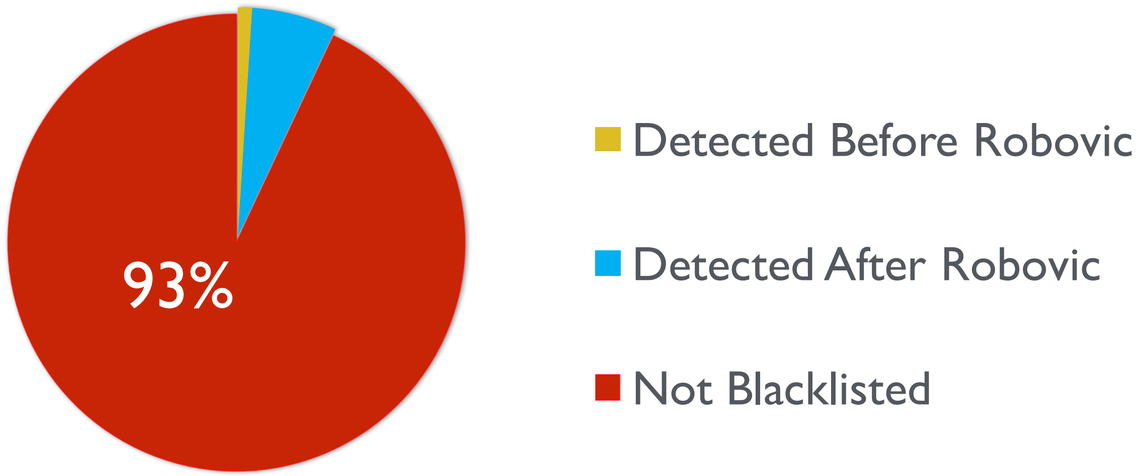
Defense: Sufficiency of Current Blacklists

Blacklists: Phone Numbers

	Database	Coverage	Claimed Size
Website	mrnumber.com	19.9%	1.5 billion numbers
	800notes.com	18.5%	Unknown
	numberguru.com	1.0%	29 million lookups
	badnumbers.info	0.2%	968,639 complains
	callersmart.com	0.1%	5.9 million lookups
	scamnumbers.info	0.1%	31,162 numbers
Mobile App	Should I Answer?	0.5%	640 million lookups
	Truecaller	0.5%	2 billion numbers
	Hiya	0.3%	100 million numbers
	CallDetector	0.1%	100,000 complaints monthly
	Mr. Number	0.1%	1.5 billion numbers
	Together	**27.4%**	-



Blacklists: Domain Names



6 Blacklists (370K domains and IP addresses Together)

- hpHosts
- SANS suspicious domains
- malwaredomains
- malwaredomainlist
- Malc0de database
- abuse.ch

Why do blacklists not work?

- Tech Support Scams are highly dynamic
  - 30% of the domains are alive less than a day
  - Abusing CDNs to get fresh URLs
  - Majority of phone numbers registered recently
  - Phone numbers are generated dynamically

Defense against Tech Support Scam

- User Education
  - Explaining the concept of technical support scams is easier
  - Raising awareness through public services
- Browser Support
  - Average users do not know how to kill the browser process and clearing recent history
  - One universal shortcut to close unsafe pages

Summary

- Tech support scams pose a serious threat
- We conducted the first systematic study of tech support scams
- Reported prevalence of the scam and evasion techniques based on the collected corpus of thousands of domains and phone numbers
- Clustered campaigns and estimated their life time
- Interacted with 60 different scammers and identified the social engineering techniques
- Underline the need for user education and support from the browser vendors

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***Abstract*—In technical support scams, cybercriminals attempt to convince users that their machines are infected with malware and are in need of their technical support. In this process, the victims are asked to provide scammers with remote access to their machines, who will then "diagnose the problem", before offering their support services which typically cost hundreds of dollars. Despite their conceptual simplicity, technical support scams are responsible for yearly losses of tens of millions of dollars from**

Even though this type of scam costs users millions of dollars on a yearly basis [1], [2], there has been no systematic study of technical support scams from the security community. Thus, while today we know that these scams do in fact take place and that scammers are successfully defrauding users, any details about their operations are collected in an unsystematic way, e.g., by victimized users recalling their experiences, and